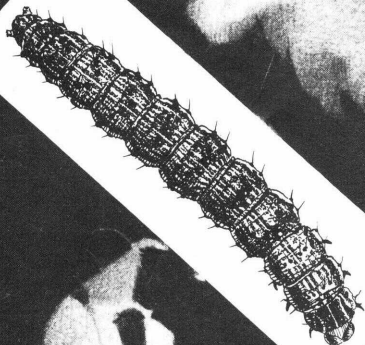


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# THE TOBACCO BUDWORM ... how to control it

Farmers' Bulletin No. 2174  
U.S. Department of Agriculture

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Growth Through Agricultural Progress

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# THE TOBACCO BUDWORM

## . . . how to control it

By NORMAN ALLEN and FRANCIS LAWSON, entomologists  
Entomology Research Division, Agricultural Research Service

The tobacco budworm<sup>1</sup> is a serious pest of tobacco plants. It is widespread and very destructive in the Southern States, where it must be controlled every year if tobacco crops are to be profitable. In northern areas, it seldom occurs in numbers sufficient to cause important damage.

The budworm is similar in appearance to the corn earworm,<sup>2</sup> which also damages tobacco in some areas. However, you do not need to distinguish between these two species, because the same insecticides will control both.

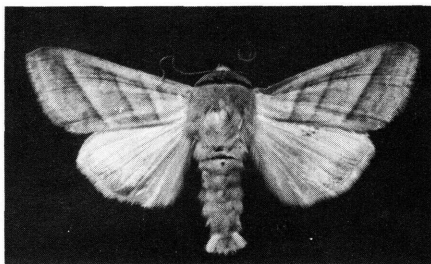
### DEVELOPMENT AND HABITS

The tobacco budworm has four stages of development—egg, larva, pupa, and adult.

Adults, which are moths, emerge from the soil in spring. Females lay their eggs on the seed heads of tobacco plants. Where plants have not produced seed heads, the females lay eggs singly on the undersides of leaves;

usually they select the leaves that grow from fourth to tenth below the bud. Where tobacco has been topped, most of the eggs are laid on sucker leaves. In hot weather, the eggs hatch in 2 to 3 days into tiny worms, or larvae.

Young larvae may appear in destructive numbers any time after the plants begin to grow after transplanting. Where eggs have been laid below the buds, newly hatched larvae crawl about over the leaves for a day or longer. Eventually they reach the buds and conceal themselves between immature leaves. Where eggs have been laid on seed heads, the larvae bore into buds or seed pods and destroy them. Larvae



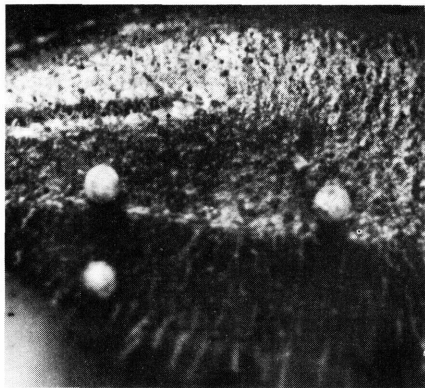
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Adult (moth) of the budworm.

<sup>1</sup> *Heliothis virescens*.

<sup>2</sup> *Heliothis zea*.





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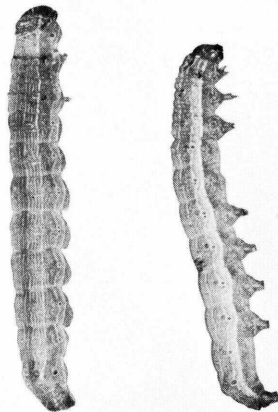
**Eggs of the tobacco budworm.**

on plants that have been topped feed on the top leaves.

During summer months, larvae reach maturity in about 2 weeks. They are about  $1\frac{1}{2}$  inches long when fully grown. Usually they are light green and have paler green stripes running lengthwise on the body. The color may range from green to yellowish brown or dark reddish brown. When fully grown, larvae enter the soil and change to pupae.

The pupal, or resting, stage is spent beneath the surface of the soil. If this stage occurs during summer, it is completed in 6 to 10 days; if it occurs in winter, the insect remains a pupa until spring. Pupae are about  $\frac{3}{4}$  inch long, and brown. They change into adults, and emerge from the soil.

Adult budworms are greenish moths. They have two pairs of wings, and a wingspread of about  $1\frac{1}{4}$  inches. Forewings are light green, obliquely crossed with three lighter stripes. Hindwings are silvery, and bordered with a brownish fringe. The moths are active only

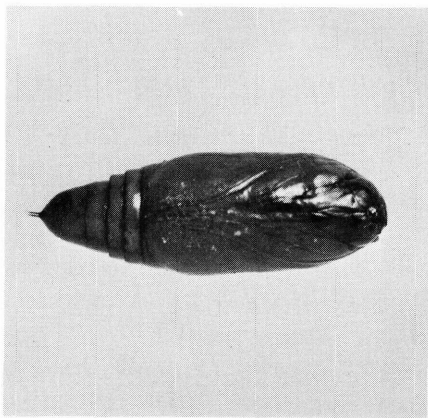


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**Tobacco budworms (larvae), nearly full grown.**

at night. They hide during the day among leaves of the tobacco plants. When disturbed, they dart quickly to new hiding places.

A generation of these insects, from egg to adult, is produced during summer in about a month; it takes longer in spring and fall.



TC-3621

**Pupa of the tobacco budworm.**

## DAMAGE

Only the larvae cause damage to tobacco plants. Before they reach the buds, young larvae make small holes, like pinholes, in the leaves. These holes damage the leaves of cigar-wrapper tobacco, but do not cause important injury to other types of tobacco. However, when larvae are 5 to 6 days old they are about  $\frac{1}{4}$  inch long, and from this time they can severely damage any type of tobacco. As they grow larger, they may feed in buds and on adjacent leaves, causing severe damage to the crop.

When plants are not topped, large larvae may move down and feed on upper leaves. When plants are grown for seed, a single larva will attack several flowers or pods, causing them to fall off, and reducing seed production.

In areas of Georgia and South Carolina where flue-cured tobacco is pro-



BN-13103-X

**Late-season injury to top leaves of tobacco plant after it has been topped.**



BN-13096-X

**Budworm injury to bud and adjacent leaves of small tobacco plant.**

duced, severe damage may occur after plants are topped. Usually this is caused by the tobacco budworm and corn earworm feeding on plants at the same time. Such damage may result in loss of three or four leaves on each plant.

## USING INSECTICIDE

By proper use of insecticide, you can control tobacco budworms that are present and protect plants from budworm damage for several days after treatment. To achieve best control and best protection, apply insecticide to buds and nearby leaves of plants.





BN-13100-X

**The "pinch" method of applying a DDT or TDE bait.**

## Selecting Insecticide

You may apply insecticides as dusts, sprays, or poison baits. Usually dusts are more effective than sprays. Sprays may give good control if your sprayer is of a type that will efficiently place spray into buds and on adjacent leaves. Excellent control can be achieved with poisoned baits.

## Applying Insecticide

The method of applying insecticide is usually determined by the kind of tobacco and the purpose for which it is being grown. Refer to the accompanying tables: Table 1 tells how to apply insecticide directly to the buds; table 2 tells how to apply it to the top foliage.

When dust or spray is applied with conventional equipment to the entire



BN-13101-X

**Applying dust to bud of plant with small, plunger-type hand duster.**

upper parts of the plants, it destroys many budworms on the foliage before they reach the buds. To be successful, applications must be made before buds become infested. This method of control has been especially effective in preventing damage to cigar-wrapper tobacco. Foliage applications on other types of tobacco may give fairly good control if made at frequent intervals, but usually they are of most value where they can be used for combined control of hornworms, budworms, corn earworms, and other insect pests that appear on the plants at the same time.

For budworm control after plants have been topped, apply insecticide to the foliage.

### Number of Applications

The number of applications required during a season will depend on intensity of budworm infestations, efficiency and timeliness of applications, and the equipment being used.

Shade-grown tobacco that is produced for cigar wrappers requires a high degree of plant protection. To achieve this, start your applications soon after plants are set in the field,

TABLE 1.—*Guide for applying insecticide to buds*  
SUN-GROWN TOBACCO

Means of application, insecticide, and formulation	Dosage and directions
<p><i>Hand Dusters</i></p> <p>Dusts: DDT, 10 percent. TDE, 10 percent.</p>	Apply 4 to 6 pounds of dust per acre. Apply to the buds so that each bud receives a thorough, even coating.
<p><i>Hand Sprayers</i></p> <p>Emulsifiable concentrates: DDT, 25 percent. TDE, 25 percent.</p>	Mix 1 pint of emulsifiable concentrate in 10 to 15 gallons of water. Apply this amount of spray to each acre. Direct the spray into the buds.

### SUN-GROWN AND SHADE-GROWN TOBACCO

<p><i>Hand, or Pinch</i></p> <p>Bait: 10-percent DDT or TDE dust mixed with sifted cornmeal.</p>	Mix at ratio of 10 pounds of dust to 75 pounds of cornmeal. Mix thoroughly. Drop a generous pinch of mixture into bud of each plant. Use 6 to 10 pounds per acre.
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and repeat them about once a week throughout most of the growing period. For other types of tobacco, start your applications when the first eggs and

larvae appear on the plants. Two to four applications during the season should give good control on all except shade-grown tobacco.

TABLE 2.—*Guide for applying insecticide to top foliage*  
SUN-GROWN TOBACCO

Means of application, insecticide, and formulation	Dosage and directions
<i>Traction and Power Dusters</i>	
Dusts: DDT, 10 percent. TDE, 10 percent. Endrin, 1 to 2 percent. <sup>1</sup>	Apply 8 to 20 pounds of dust per acre. Apply to top foliage.
<i>Traction and Power Sprayers</i>	
Emulsifiable concentrates: DDT, 25 percent. TDE, 25 percent. Endrin, 19.5 percent. <sup>1</sup>	Apply 1 pint of DDT or TDE emulsifiable concentrate, or ½ pint of endrin emulsifiable concentrate, per acre. Mix the concentrate with water. Use enough water to enable you to wet the foliage with spray. Apply to top foliage.

#### SHADE-GROWN TOBACCO

<i>Traction and Power Dusters</i>	
Dust: DDT, 10 percent.	Apply 10 to 20 pounds of dust per acre. Apply to top foliage.
<i>Aircraft</i>	
Dust: DDT, 10 percent.	Apply 10 to 20 pounds of dust per acre. Apply after plants are about 6 weeks old.
Emulsifiable concentrate: DDT, 25 percent.	Apply 1 to 2 quarts of emulsifiable concentrate per acre. Apply concentrated spray on maturing plants.

<sup>1</sup> To avoid imparting objectionable tastes or odors to the tobacco, do not apply more than 0.4 pound of actual endrin per acre. See "Precautions," page 11.



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### **Applying a dust mixture over tops of plants.**

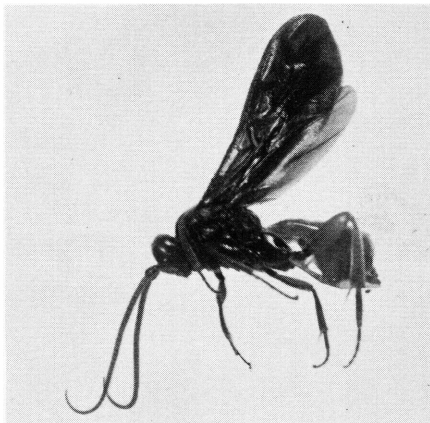
Excessive applications of insecticide may cause some damage to tobacco leaves. This is especially true when dusts are applied to rapidly growing plants that are wet. You can achieve good control by applying insecticide when plants are dry. Applications should be light, and evenly distributed over parts of the plant that are being treated.

### **NATURAL ENEMIES**

A number of parasites, predators, and diseases destroy budworms and help keep their populations under control.

In southern tobacco-growing areas, an important natural enemy of the budworm is a black-winged, red-bodied, wasplike insect that lays its eggs inside budworm larvae. Larvae attacked by this insect may still cause considerable damage because they do not die until they are more than half grown.

In northern tobacco-growing areas, many budworms are destroyed by a small parasite that kills the larvae before they are half grown. Presence of this insect may be detected by the small, black-and-white or brownish cocoons that it spins, usually seen on leaves near



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**Wasplike insect, an important parasite of the tobacco budworm.**

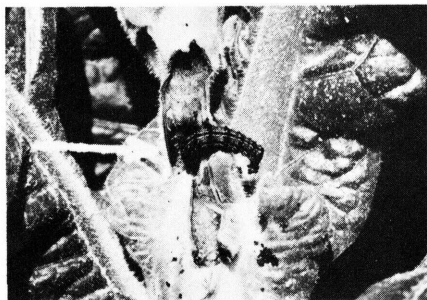
where the budworm was feeding. Larvae attacked by this parasite do very little damage.

Other enemies of the budworm are several species of paper wasps; a large, green spider called *Peucetia viridans*; and insect diseases.

## THE CORN EARWORM

The corn earworm closely resembles the tobacco budworm, and sometimes is called the false budworm. Both species may be present on tobacco plants at the same time. Their feeding produces the same type of injury to leaves.

The corn earworm seldom injures shade tobacco. It may attack flue-cured tobacco throughout the plant's growing period. It is likely to be most troublesome during the latter part of the growing season; then it may cause widespread damage to the crop, or it



BN-13098-X

**Corn earworm boring into heart (bud) of tobacco plant.**

may confine its attack to the flowers and seed heads.

Corn earworms sometimes migrate to tobacco from various weeds. Then the larvae may destroy the buds, eat the leaves, or bore into the stalks.

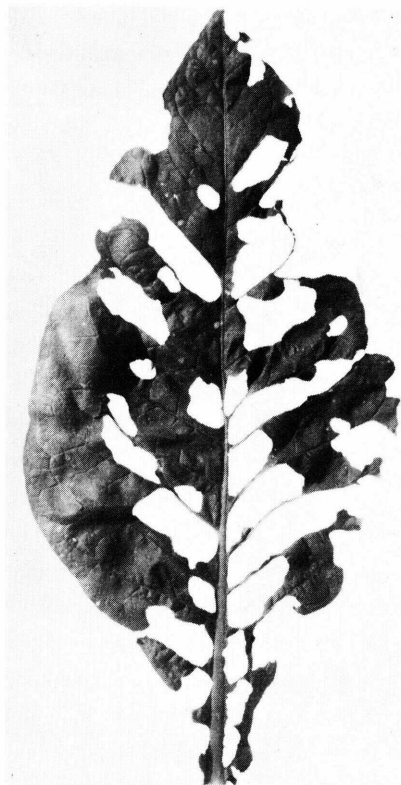
In northern areas, both the tobacco budworm and corn earworm attack tobacco in small numbers. There, the



BN-12865

**Tobacco plants, leaves removed, showing holes made by larvae of the corn earworm.**





BN-13097-X

**Late-season injury to leaf near top of the plant.**

earworm usually is considered to be more injurious than the budworm.

The corn earworm is controlled by the same insecticides that are recommended for use against the tobacco budworm.

## **CULTURAL CONTROL**

Good cultural practices can help keep the budworm under control.

Destroy plants in seedbeds as soon as the beds are abandoned. If you allow them to grow they will become breeding places for budworms.

If you grow tobacco under shade cloth, keep the cloth walls, tops, and gateways as tight as possible. This prevents moths from entering.

Cut down or otherwise destroy the tobacco stalks within 2 weeks after the end of the harvesting season. If plants are left standing, they become breeding places for budworms and other insect pests.

Topping the plants usually is done for cultural benefit rather than for insect control. However, topping removes budworm eggs and larvae from seed heads and terminal leaves and substantially reduces late-season infestations.

You can destroy many budworm pupae in the soil, and reduce the number of moths that will emerge the following spring, by plowing tobacco fields in the fall or winter months. This will also destroy many tobacco hornworms that overwinter in the soil.

## **PRECAUTIONS**

Insecticides are poisonous; handle them with care. Follow directions and heed all precautions on container labels. Keep insecticides in closed, well-labeled containers, in a dry place where children or pets cannot reach them.

Wear the clothing and equipment recommended to protect you against the particular insecticide you are using. Do not inhale dusts or mists. Wash hands and face before eating or smoking. Bathe after working with insecticide, and wash your clothing before wearing it again.

Endrin is extremely poisonous and may be fatal if swallowed, inhaled, or

absorbed through the skin. This highly toxic insecticide should be applied only by a person thoroughly familiar with its hazards who will assume full responsibility for safe use and will comply with all precautions on the labels.

If you must handle tobacco within 5

days after applying endrin, protect your skin from contact by wearing tightly woven clothing; wear rubber gloves or clean, dry cotton gloves.

If you use a walking traction sprayer, see that it is equipped with a protective shield.



TC-3625

**Fully grown seedbeds are breeding places for the budworm.**